

## ABSTRACT

5 A preservation method for biological material having cell membranes includes reversibly porating the cell membranes; loading a bio-protective agent having bio-preservation properties to a predetermined intracellular concentration; preparing the bio-protective agent loaded biological material for storage; storing the biological material; recovering the stored biological material from storage; and reversing the cell membrane poration. H5  $\alpha$ -toxin, 10 a genetically engineered mutant of *Staphylococcus aureus*  $\alpha$ -hemolysin, may be used as a porating agent. Non-permeating sugars such as trehalose and sucrose may be used as the bio-protective agent.

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